DRiVER

JUNE 1973

WHAT ABOUT A HYDROGEN-FUELED CAR?

TRADE SECRETS- Safety in Racing

THE BACK-YARD MECHANIC

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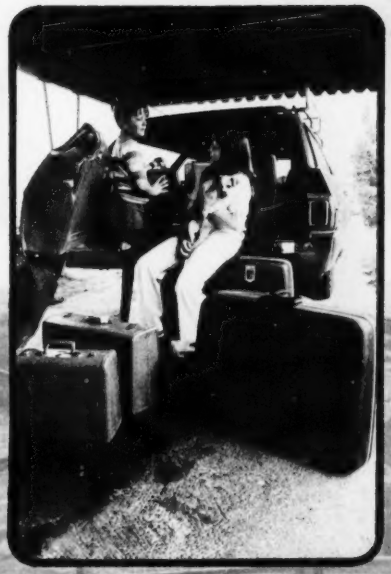
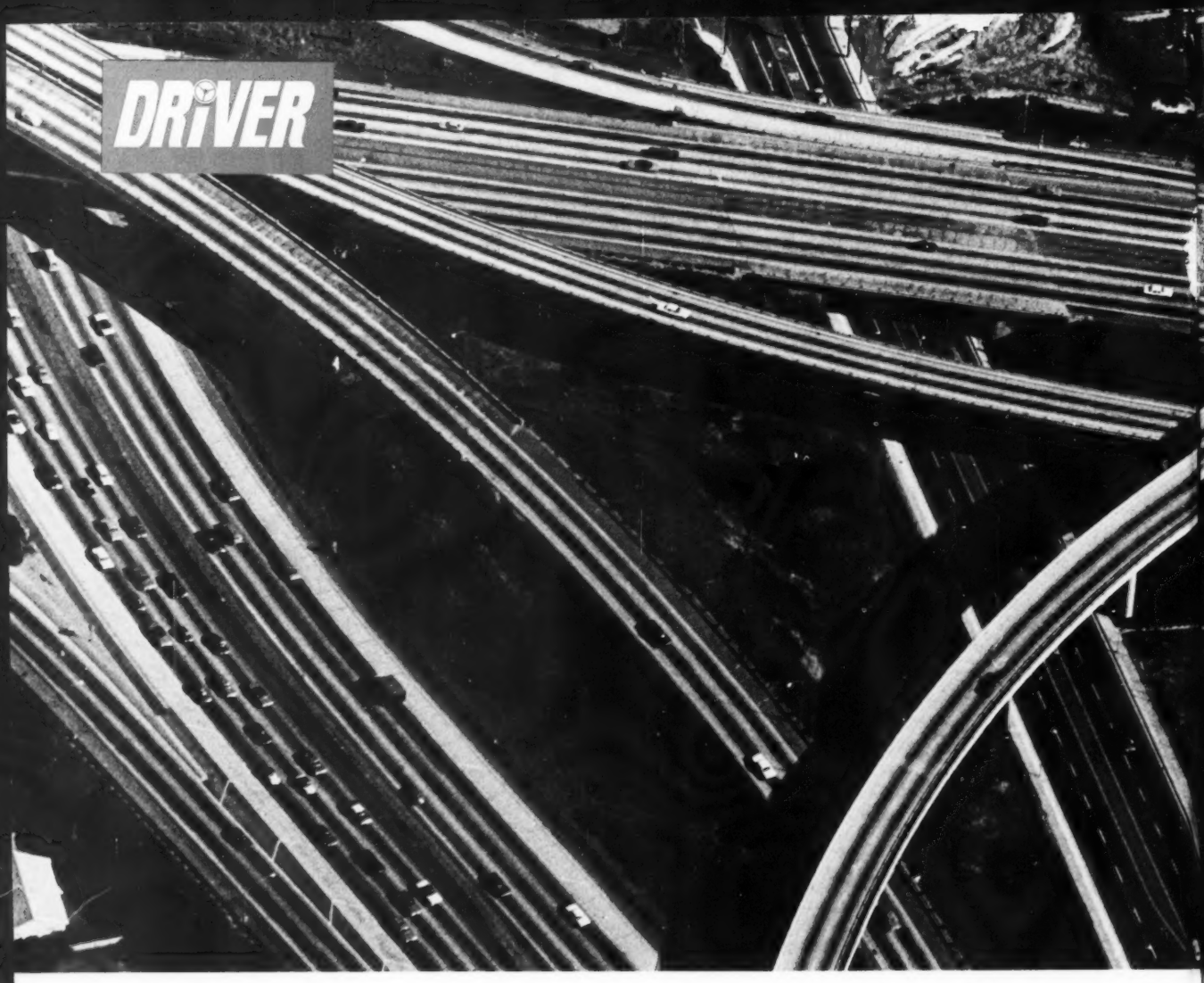


FAMILY CROSS-COUNTRY

SIXTY FEET OF TEXAS HIGHWAY



A trip across the country can be a happy adventure for your wife and family—if you do your part before you leave them on their own

FAMILY CROSS-COUNTRY TRIP

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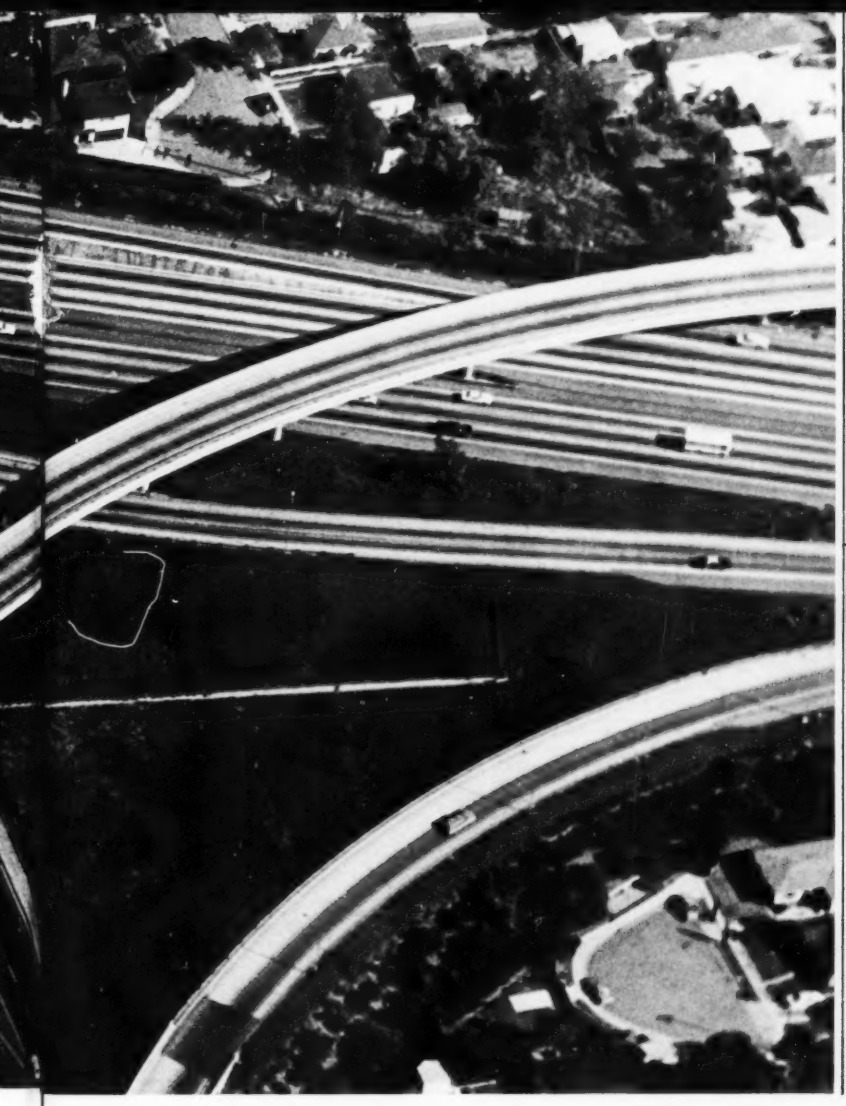

Pre-plan the trip. Oil companies and auto clubs offer excellent routing and reservation services. . . . Have the car thoroughly checked over by a first-class mechanic, and show your wife how to check under the hood.

The end of June will, of necessity, bring the usual mass travel for service families. Some are headed overseas, or back, and others are making change-of-station moves in the U.S.

There will be many instances when the servicemember must, for one reason or another, precede his family. This means your wife and children may be making such a trip on their own to the new duty station, or to an overseas port.

DRIVER hopes the following information will be of value to your wife if she has to struggle with big-city traffic, a car full of kids and household goods, long days of driving, and road maps that won't refold properly.

FIRST THINGS FIRST

One thing the servicemember can do to help his family is to have the car *thoroughly* checked out at a reliable garage. We don't mean a "quickie" tuneup, either; we mean checked from radiator to taillights—and the trailer, too, if one is to be towed along. Take the car to a mechanic you can trust with the job. You will pay top labor rates, but it makes for peace of mind. You'll rest easier if you know your family will be traveling in a mechanically sound car.

Have the car lubed and the oil and filter changed. Get a first-class engine tuneup, and be sure the headlights are working and aimed properly. If you are a good "back-yard mechanic," you can do a lot of this work yourself; but have a pro mechanic check the steering system as well as the exhaust and electrical systems. Also, have the automatic transmission checked and serviced. If the car has air conditioning, it is advisable to have it inspected by a specialist to insure it is properly charged, and has good hoses and tight clamps.

The brakes, tires, wheels, and suspension should be carefully looked over before the big trip. Make sure the battery is given a cell check, and that the cooling system is properly inspected, the radiator flushed, hoses checked, and coolant replenished. (See "The Back-Yard Mechanic," this issue.)

continued

DRIVER

THE TRAFFIC SAFETY MAGAZINE FOR THE MILITARY DRIVER

DEPARTMENT OF THE AIR FORCE

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Tire Special

AFRP 127-1

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THE EDITOR SPEAKS

DOUBLE CLUTCH

There is a new joint service regulation (AFR 125-14) that should be of interest and concern to all base, post, and station commanders. Entitled "Motor Vehicle Traffic Supervision," it sets down commander's responsibilities in establishing periodic inspections for POVs registered on their installations.

Such inspections must at least meet the state standards where the installation is located. For those installations located in areas where state standards do not exist, the regulation sets forth the requirements to be met.

While installation commanders are now responsible for the enforcement of the new regulation, they should also feel bound to do everything they can to help their personnel meet the inspection standards. Base auto hobby shops are an excellent source for such assistance; here the serviceman can get expert help and gain a working knowledge of his vehicle.

Too many operators do nothing for their vehicles until something breaks. And then, perhaps, it is too late. (See "How Goes It?" this issue.)

The new regulation can be an important management tool for commanders, and its provisions can be the means of greatly reducing the number of improperly maintained POVs. •

PRECAUTIONS

Now that you are sure everything mechanical has been completely checked out, how about emergency equipment?*

Is there a family-size first aid kit in the car? Is the spare tire safe to use, and does it have the correct pressure? Show your wife how to use the tire gage; service station air pump gages aren't always reliable, and tires that are too soft or too hard can make for miserable as well as unsafe driving. Your owner's manual shows how to compute the tire pressures to compensate for heavy loads.

What about the lug wrench and the jack? Can your Better Half change a wheel?** Get her a heavy-duty hydraulic jack or tell her to be sure to partially unload the car before she tries to use the bumper jack; it probably won't stand up under the extra weight, and could collapse and pin one of your dependents inside a wheel well.

If there are teenagers in the family, you're ahead of the game. The boys can change the wheel, and the girls can unload and reload the car while your wife exercises her supervisory authority.

Have you checked to see if there are emergency flares, and perhaps a couple of stand-up reflectors on board?#

Car games for the younger children will assure peace-of-mind for the older people on a long trip. A 25¢ notebook makes an adequate trip log, and will provide good information for next year's tax returns. (Trip expenses such as gasoline taxes and toll fees are deductible.) It will also make a pleasant permanent record for the family to look back on in future years, especially if they have remembered to use a camera on the way.

What about credit cards and traveler's checks? They make any trip a lot safer financially; traveler's checks can be easily and quickly replaced if lost or stolen, and payment can be stopped on missing credit cards. Keep a separate record of all credit card numbers, plus where to phone or write if the cards are lost or stolen.

Before you vanish into the blue, is there a roof rack on the car? There should be, especially, if you don't have a trailer. Also, "bungee" cord tiedowns are great for securing all the stuff on the rack. Show your wife and kids how to do it.

TOWING PRACTICE

Hold it! Don't go just yet; there is still more to do. If your wife's vehicle will be towing a trailer, how about encouraging her to practice some driving maneuvers in empty parking lot? These should include backing with the trailer as well as turning corners and stopping from various speeds. It is important to get a feel for compensating for the extra room required when pulling a trailer, and for the increased stopping distances.

Before your wife leaves on her trip, she should make a short drive with the loaded trailer and check for swaying and trailer stability. High-sided trailers are generally more susceptible to swaying than low ones. Improper hitching or loading can cause dangerous swaying. It is important that the trailer tires be kept at the recommended pressures. Caution your wife against overloading the trailer because this can create an undue strain on the hitch and your car's engine, suspension, and frame. Information on how to correctly distribute the trailer load is available from the dealer, or in most trailer manuals.

One final precaution concerning the trailer: impress on all the kids that riding in the trailer is illegal and dangerous while it is under tow.

PET STOPS

One last chore, and then you can go PCS all by yourself. Is the family taking along a pet? If so, the dog or cat will need regular rest stops as much as the other riders. Pass the word that regular rest stops are a must for safe, alert, and undisturbed driving. They give everybody a chance to stretch their legs and attend to

continued

Always keep within the posted speed limits and use your seat belts for a safe trip

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** See "Keeping Out of Trouble . . . With an Emergency Tool Kit," Dec '72 DRIVER.*

*** Miss DRIVER, Dec '72, tells how to teach the wife how to change a wheel.*

 # See "What You Should Do?" Jan '73 DRIVER, on how to place road flares.

continued

FAMILY CROSS-COUNTRY TRIP

other matters, and also give the car a chance to cool off.

Now you can go, secure in the knowledge that your wife and family are well prepared for their own cross-country trip. If possible, see to it that your wife has a phone number where she can contact you.

DISTAFF DOs AND DON'Ts

Your husband has departed, and you are now facing a long road trip with the kids . . . on your own. But it's nothing to panic about; a lot of service wives have done it before you, and lots more are going to do the same thing in years to come. Just try to be *extra* careful; use your seatbelts, and drive *very* defensively.

Above all, should you become stranded, don't accept help from just any stranger that comes along. DRIVER's contact with the California Highway Patrol, officer Dave Daniels, says that the drivers of the big-company tractor trailer rigs often stop to help a stranded motorist—especially on a lonely stretch of road. Dave says these drivers are good mechanics, and can often spot the trouble and fix it. If you recognize the rig as one from a well-known firm, you are in good company—after you have asked the driver for his identification.

Otherwise, raise the hood and trunk lids to signal your distress, and get everyone inside the car; lock the doors and roll up the windows. You can talk through a closed window if you have to. If you must lower a window, open it only an inch or so.

If you should run into trouble within reasonable walking distance of a town, and have a teenage boy in the back among the suitcases, girls, and pets, you have another way out. Send him to a phone with strict instructions to call a motor-club-recommended garage, the motor club itself, or the police. In the meantime, stick inside the car and don't get out for anyone except the garagemen, or a uniformed policeman.

If you are unfortunate enough to become involved in an accident, you are required by law to exchange iden-

Give each of the youngsters a special job to do each day. . . . Be sure that luggage and other items are properly secured in the car. . . . Pets need rest stops just as much as the people. . . . Keep the roof rack load as near the center of the car as possible for better car handling.

tification and the name of your insurance company with the occupants of the other vehicle—but no law says you have to get out of the car to do it. Hold your license flat against the window so it can be read. Unless it is obviously unsafe to stay in the car, or if someone needs medical attention, stay inside the car until the police arrive.

TAKE IT EASY

Try to do all your driving during the day. Night driving poses special problems and should be avoided. Stop reasonably early in the evening at a motel or campground where you have made a reservation, and enjoy the evening hours. An early stop gives everyone a chance to unwind and relax before bedtime. This is also the best time of the day to have your big meal. A fairly substantial breakfast will get everyone off to a good start in the morning, and picnic lunches can make the noontime stop a happy time. But save the heavy meal until evening; then you won't feel groggy and sleepy at the wheel, but in bed, which is just fine.

continued

Don't allow the children to ride unsecured in the back of the car; they can get thrown around or out if you have to make a quick stop. . . . Drive well to the right and obey the speed limits for cars towing trailers. . . . If you do have trouble, wait for a uniformed policeman to show up. Put the hood up (not shown here) and stay inside the car until help arrives.

continued
FAMILY CROSS-COUNTRY TRIP

It will help if you have prepared a daily schedule of things to do each morning before you hit the road. Give each of your teenagers a specific job to do, and you will find that such things as tire pressures, gas, oil, and water are taken care of. This will make it unlikely that you will have to worry about these potential problems as you roll merrily along.

Should you happen to run out of gas or have mechanical trouble, try to get the car onto the shoulder of the road, well away from traffic. Again, if you can't fix the problem, raise the hood and trunk lids—and get back into the car. Patroling police vehicles are alert for stopped cars, and will assist you.

It isn't a good practice to carry a spare can of gas in a car that is already chock-full of family and miscellaneous items like dogs and/or cats and luggage. The can could pop a seam, and then you're in real trouble.

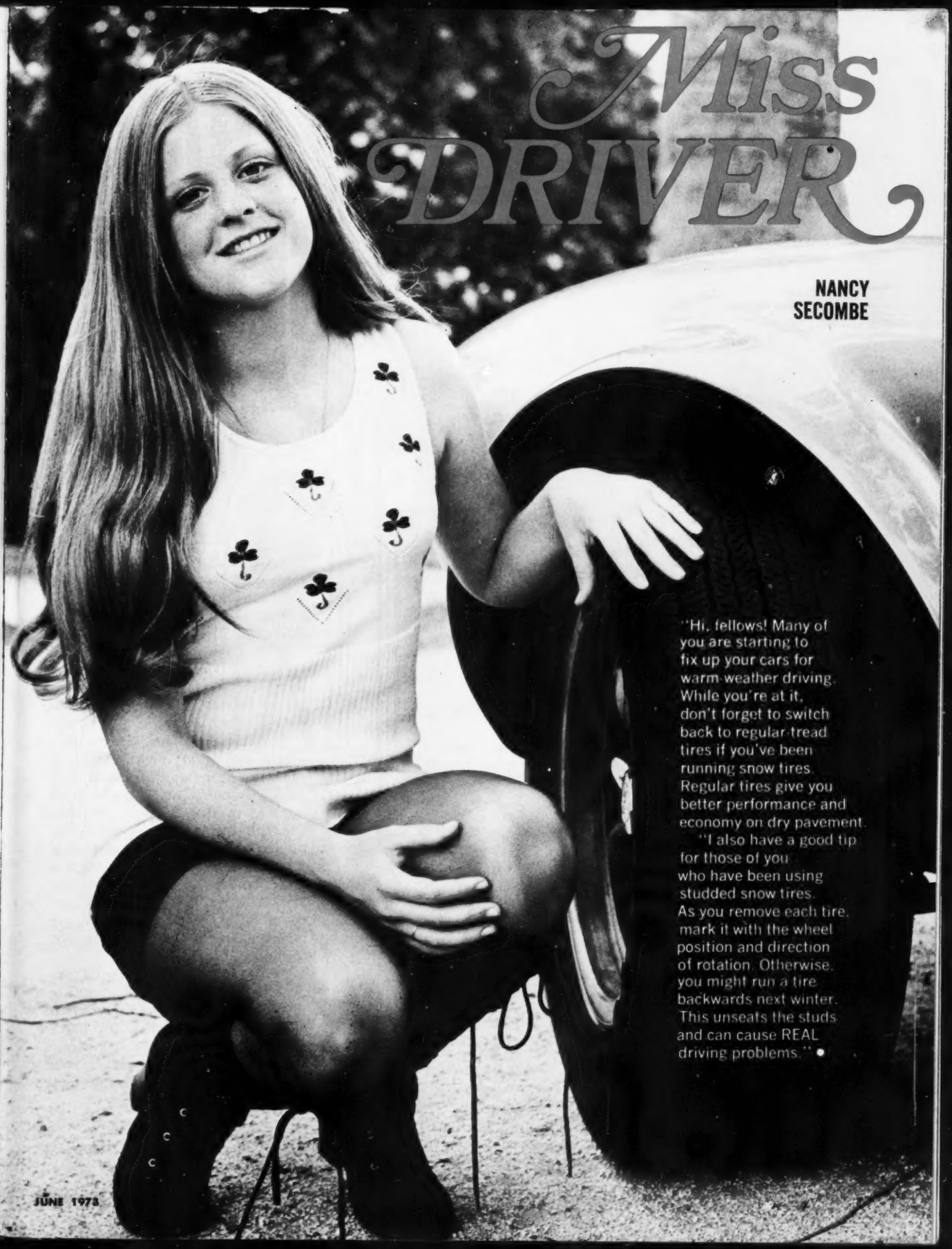
If you car doesn't have air conditioning, keep at least one window open while driving, or partially open if it is raining, to insure a plentiful supply of fresh air. Also, crack a window now and then if your car is equipped with the hang-on type air conditioner found on some cars. These types merely circulate and cool the air inside the car, so there is the danger of carbon monoxide accumulating.

The car radio can keep the kids happy for miles on end, but don't let it take your mind off the road.

One last item, and then you can pile into the car and be on your way. It's a good idea to give your husband a phone call each evening. It will keep him happy, and all you service wives know that a happy husband is something nice to have around the house.

Bon Voyage! ●

(Information from DISCOVERY, the Allstate Motor Club Magazine, Spring 1973 issue.)



Miss DRIVER

NANCY SECOMBE

"Hi, fellows! Many of you are starting to fix up your cars for warm-weather driving. While you're at it, don't forget to switch back to regular-tread tires if you've been running snow tires. Regular tires give you better performance and economy on dry pavement.

"I also have a good tip for those of you who have been using studded snow tires. As you remove each tire, mark it with the wheel position and direction of rotation. Otherwise, you might run a tire backwards next winter. This unseats the studs and can cause REAL driving problems." •

Necessary medical information on helmet
NOMEX (fireproof) scarf (covers face)
Full coverage Z90.1 and Snell-approved helmet with tinted sun screen
Suit of NOMEX or similar fireproof material
I.D. bracelet bearing blood type
NOMEX (fireproof) gloves with leather palms for sure grip on steering wheel
Full set of NOMEX (fireproof) "Longjohn" underwear
Leather shoes with soles that provide a sure grip on pedals
NOMEX socks (fireproof)

Stuart Forbes-Robinson, one of the best in the field of Formula A drivers, displays the equipment he wears when plying his trade as a professional race-car driver. Physical conditioning is an important part of a driver's preparation, 100% concentration on driving is physically demanding.

TRADE SECRETS

SAFETY IN RACING

"Two hundred and one point three seven four miles per hour, ladies and gentlemen; a new USAC* record holder, and qualifying for the 1972 California 500—Bobby Unser in the Olsonite Eagle." The white car roared around the Ontario track, with the dust kicked up in the corners indicating he was running where no other car had been.

To many of the fans, race-car driving is the world's most dangerous sport; a career more hazardous than washing windows on the top floor of the Empire State Building. This was true years ago, when cars were driven by rich amateurs only as a display of bravado. Today, however, racing is a profession. In recent years there has been a tremendous emphasis by drivers on safety. The men who drive are professionals and, as such, do not take unnecessary risks.

Competition cars and parts are made of the best materials, and are thoroughly tested before being driven at racing speeds. As these two pages show, there's a lot more safety in racing than meets the eye. These men are thoroughly prepared before they drive fast.

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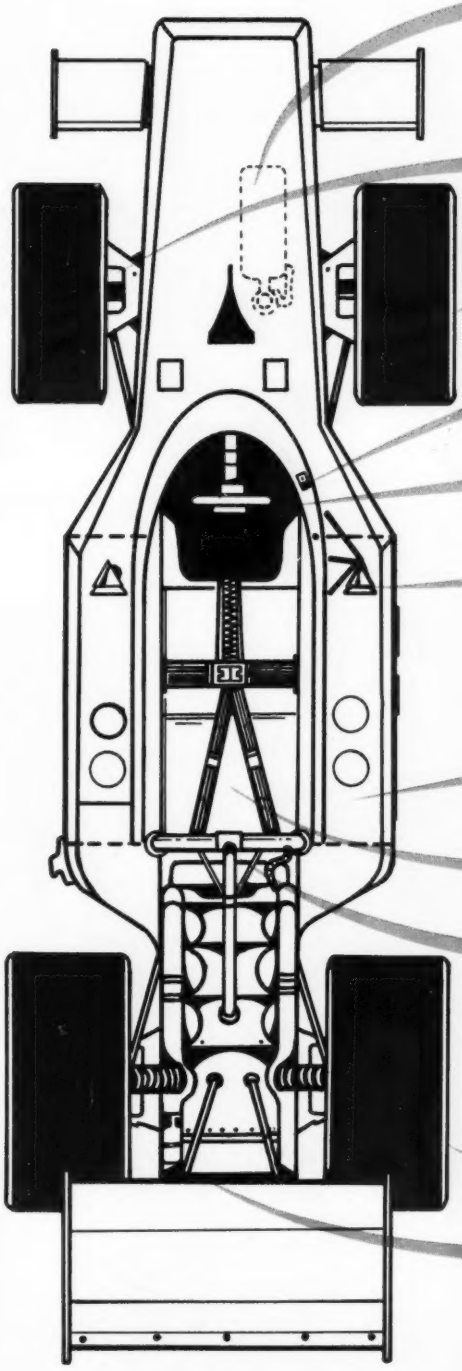
* *United States Auto Club.*

The car, like the driver, is prepared for a safe race.



Automatic fire-extinguishing system

Large four-wheel disc brakes for maximum safe braking

Appropriate tire pressure frequently checked

Clearly identified "kill" switch to shut off engine in emergency

Padded leather-covered steering wheel for maximum control

Adequate numbers of rearview mirrors

Foam-filled fuel cell to inhibit explosion or fire

Five-piece safety belts 3″ lap belts, 2″ shoulder harness, 2″ anti-submarine belt

Bucket seat to provide adequate lateral support during cornering

Roll bar

Compatible tire width/ rim width/suspension

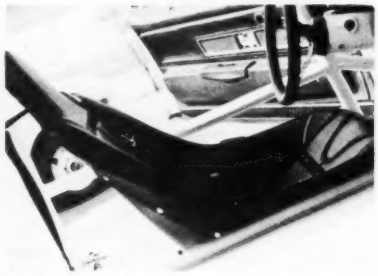
Overflow catch tank

continued

TRICKS OF THE TRADE FOR YOUR CAR

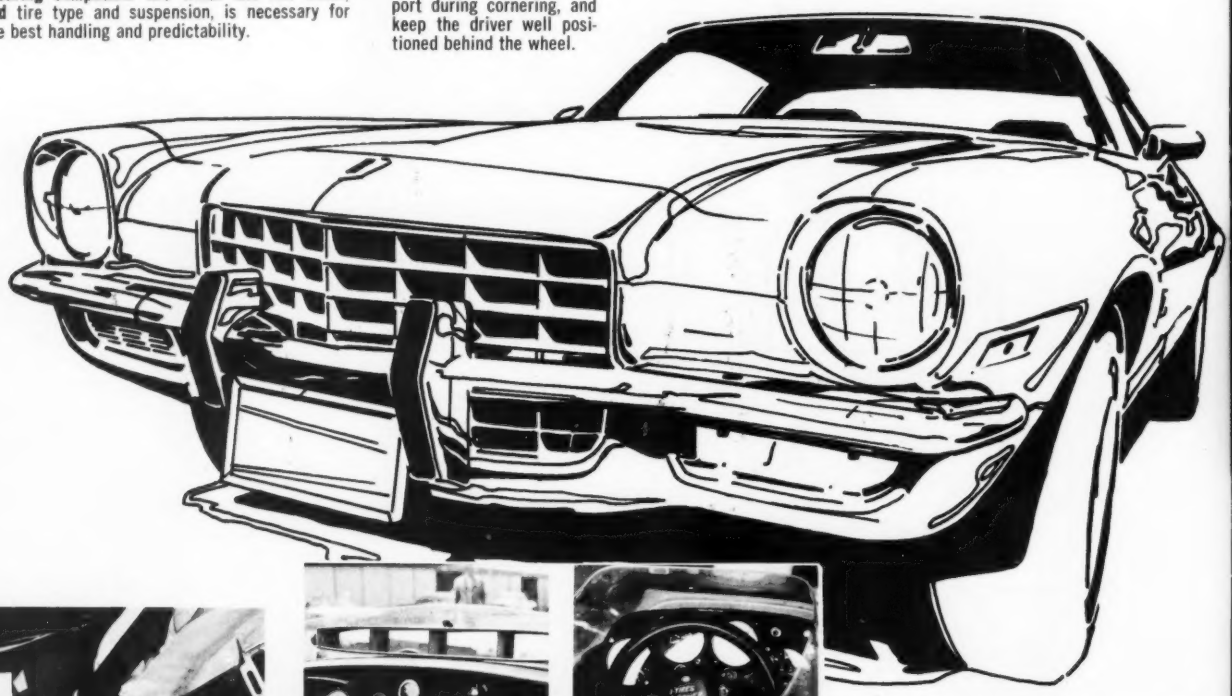
Racing has provided a number of improvements for passenger cars; here are a few special ones.

Assuring compatible tire width and rim width, **and** tire type and suspension, is necessary for the best handling and predictability.

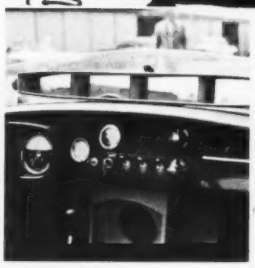


Bucket seats provide a maximum of lateral support during cornering, and keep the driver well positioned behind the wheel.

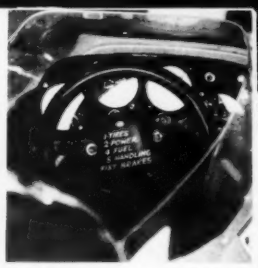
Roll bars have long been acknowledged as necessary in racing cars. In this car it can be seen that adequate protection is provided without imposing on the rear seating capability. It is also wise to carry an on-board fire extinguisher.



Proper use of crash restraints is universal among race car drivers; 2″ shoulder-harness straps, 3″ webbed belts, and a 2″ anti-submarine belt.



Rearview mirrors on cars were invented by a race-car driver. Today, special ones provide as much as 180-degree rear vision.



Most race cars use leather-covered steering wheels to provide a sure grip of the wheel.

If any serious competition is contemplated with car, a fuel cell should definitely be considered to inhibit explosion or fire.

When it comes to proper tire care and safety, there are a lot of "old wives' tales" still going around.

To help you spot some common misconceptions about tires, we've included this brief quiz by the Tire Industry Safety Council.

Are the following statements true or false?

1. To maintain better traction on snow and ice, tire inflation should be lowered during winter months.

2. New tires should be mounted on the front axle rather than the rear.

3. Before taking a long trip, it is wise to increase the air pressure in your tires.

4. Radial tires should be rotated in the same "criss-cross" pattern as conventional tires.

ten rumors SHATTERED

5. If a motorist has radial tires on the front axle, he must use radial snow tires on the rear during winter months.

6. Changes in temperature can affect a tire's inflation.

7. Tires must be registered just like cars.

8. Today's tires are so well manufactured that they require no attention, once mounted on the vehicle.

9. When tires become hot from running at sustained high speeds for long periods of time, it is a good idea to "bleed" them when you arrive at your destination.

10. Drivers should rely upon service station air towers when inflating their tires to recommended pressure limits.

(See below for answers)

Answers to TEN RUMORS SHATTERED

1. False. Decreasing tire inflation actually cuts down on traction, as less rubber is making contact with the road.

2. False. Safety experts note that when tires are involved in accidents, they are usually worn out or damaged tires found on the rear axle. Therefore, for safety's sake, put new tires on the rear.

3. True. Pressure can be increased up to 4 pounds, but never to exceed the maximum limit designated on the sidewall. The increased pressure gives added stability to a tire being run at high speeds for sustained periods of time.

4. False. Radial tires should be rotated front to rear, only, always keeping the tires on the same side of the car.

5. True. Because of the gripping power of the radial tire, using a conventional snow tire increases the risk of skidding and losing control.

6. True. For every 10-degree drop in temperature, a tire can lose 1 pound of air pressure.

7. True. Federal requirements now state that any tire manufactured after 22 May 1971 must be registered when bought. The dealer is required to furnish the manufacturer with the purchaser's name and address, and tire identification code found on the sidewall.

8. False. Although today's tires are the safest and longest lasting ever made, they do require regular attention to inflation, irregular wear patterns caused by misalignment or poor shock absorbers, and to the removal of glass, stones, and other foreign matter lodged in the tread grooves.

9. False. Never "bleed" the tire; but pressure should be checked, once the tire has cooled.

10. False. Motorists should have individual hand pressure gages to check inflation, as service station air towers have been found to be inaccurate in many cases.

(Reprint courtesy Firestone Tire and Rubber Company)

You probably won't see hydrogen cars appearing around every corner for some time. But interest is rising in this fuel method which, unlike propane power, does not drain a natural resource (see "What About a Propane Car?" Mar '73 DRIVER).

Several auto companies and research groups are deep into the study of propane as a possible replacement for gasoline. So it's not too unlikely this system of "power-by-the-pound" may some day be available to the public.

WHAT A HYDROGEN-FUELED CAR?

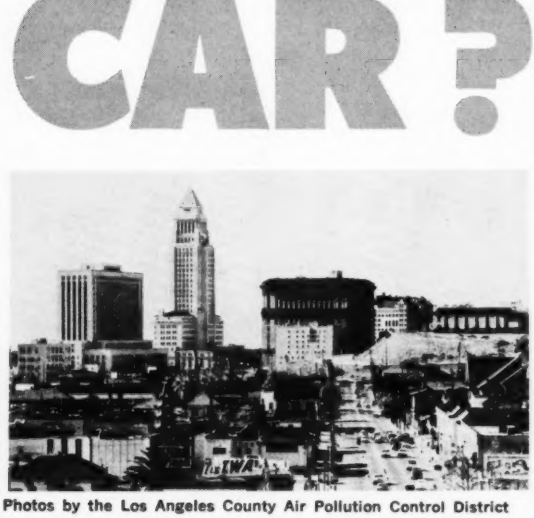
MANY-SIDED PROJECT

A group of engineering students at UCLA is presently working on a hydrogen-fueled car, and the project has won national recognition. Using a 1972 Gremlin, they have packed in many novel suspension, steering, and passenger-safety developments as well as the hydrogen-fueled engine.

A Ford 351-cid engine powers the little car which now tips the scales at 4,000 pounds and develops 200 hp. The students say it accelerates as quickly as the stock Gremlin, and gets 10 miles to the pound of hydrogen gas, a total of 60 miles to the tank with the present setup.

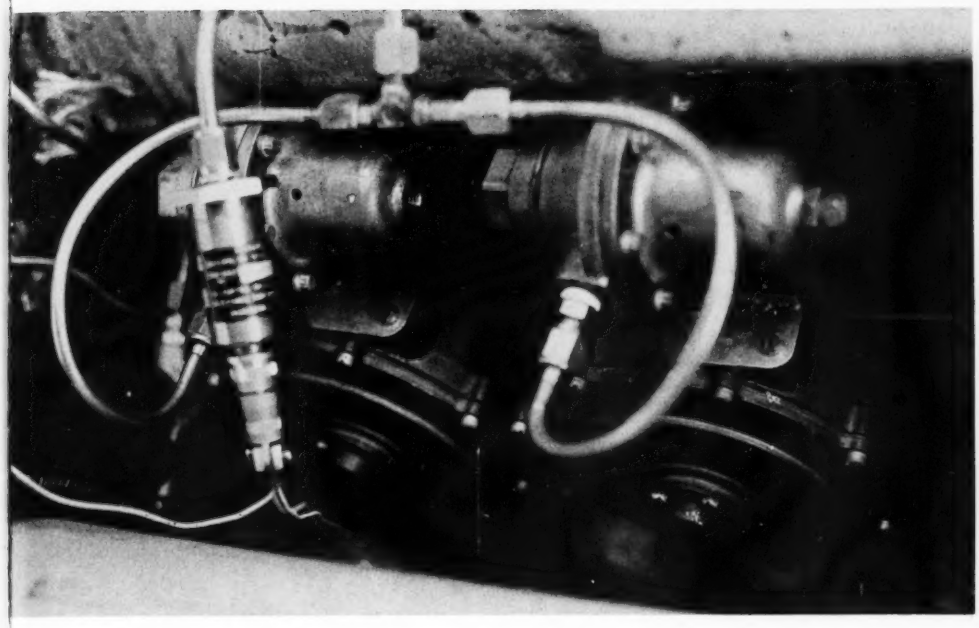
EXCEEDS '76 EMISSION STANDARDS

The basic aim of the UCLA students was meeting or exceeding the 1976 Federal emissions control standards. Their hydrogen-fueled car has completely licked those requirements. Federal standards have been set at: hydrocarbons, 0.41 gms/mi (grams per mile); carbon monoxide, 3.4 gms/mi; and oxides of nitrogen, 0.4 gms/mi. The UCLA car tests out at 0.0 gms/mi for hydrocarbons; below sensitivity on the carbon monoxide scale, and a mere 0.2 gms/mi for oxides of nitrogen. Water vapor is the principal exhaust emission. (Hydrogen is produced from water.)



Photos by the Los Angeles County Air Pollution Control District

Another interesting approach to the energy and emission crises



This pair of double-reduction valves for the hydrogen tanks reduce the pressure from 6,000 psi to 12 psi before the gas is introduced into the engine induction system.

Joe Finegold, UCLA graduate engineering student in charge of the hydrogen-fueled car project since 1970, says the hydrogen-fueled Gremlin accelerates as quickly as the lighter, stock-powered Gremlin.

T ABOUT
-FUELED

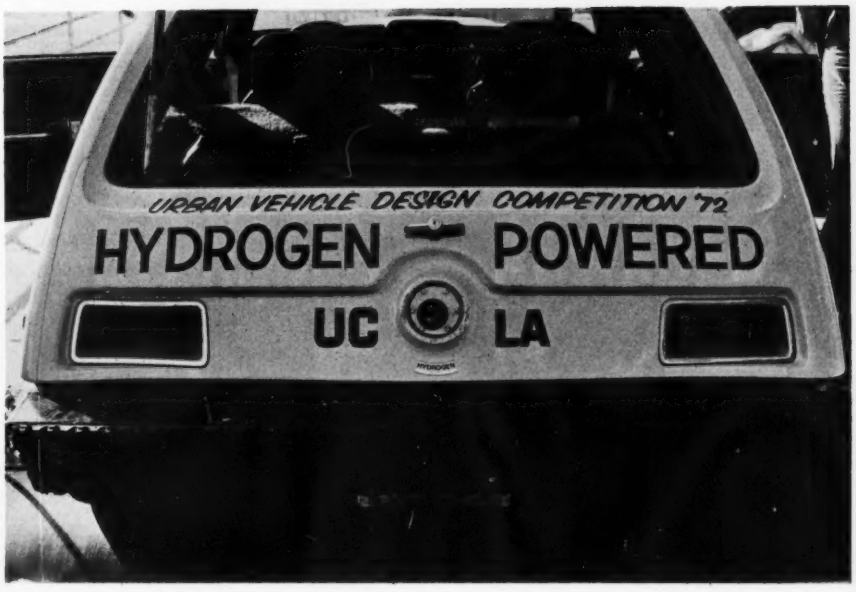
Exhaust gases from two of the eight cylinders are returned to the induction system where they mix with the fuel/air mixture to help slow combustion in the cylinders. This has cured an earlier persistent back-firing which had been a major bug in the car's development.

All carbon products of combustion are theoretically eliminated says the UCLA group. The only possible exception, DRIVER was told, would be caused by lubricating oil leaking into the combustion chambers.

STEERING, BRAKES, AND POPCORN

Several unique steering, braking, and passenger-safety devices are built into the Gremlin. Balanced, fade-proof disc brakes with metalized pads are up front, and metalized brake linings are in the rear. A variable-ratio power steering system, stiffened

continued



No doubt this is a hydrogen-fueled car. It won national recognition for the UCLA students because of its extremely low exhaust emission rates.

Additional passenger safety is provided by the massive roll-over bar/luggage rack frame that will support 10 times the car's weight.

anti-roll stabilizers, and high-damping shocks contribute to the car's maneuverability and road handling.

Special bucket seats and aircraft-type four-point safety harnesses give good body support and provide excellent crash restaint for the passengers.

An ingeniously simple low-speed-crash bumper system uses popped popcorn as the energy-absorbing factor. When either of the bumpers is hit, the popcorn crushes and the bumper compresses several inches toward the car body. The bumpers are easily removed, and the crushed contents can be replaced with fresh popcorn.

Should this car ever roll over, additional passenger safety is assured by the built-in roll cage/roof rack that will support 40,000 pounds—10 times the car's weight.

The rear quarter-windows have been enlarged to improve rear vision when reversing.

ENGINE CONVERSION EASY

Converting the Ford engine to burn hydrogen was relatively easy, the students said. The gasoline carburetor was replaced with a propane carb, and the timing was set at 17 degrees BTDC.* Standard spark plugs are used.

At present, two gas cylinders behind the front seats are used for fuel storage. The gas is compressed to 6,000 psi, but double-reduction valves cut this to 12 psi before it gets to the engine induction system.

A 20-gallon metal hydride** fuel-storage system is being developed that will give mileage comparable to that of a similar-sized gasoline tank.

BRIGHT FUTURE

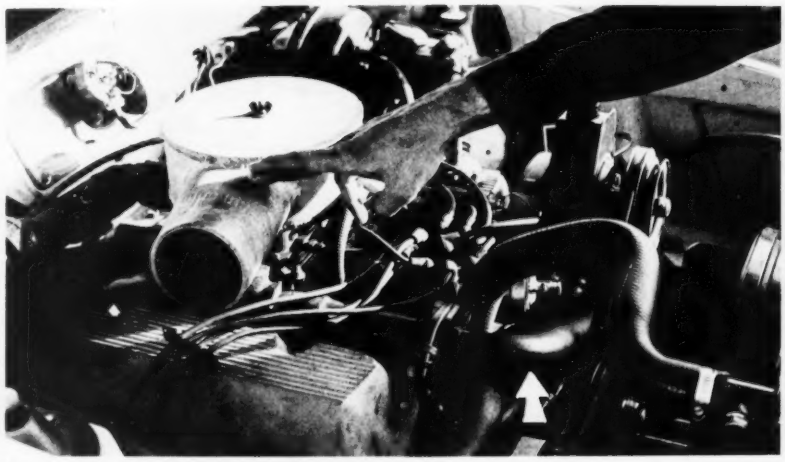
The UCLA hydrogen-fueled car is still under development, but the students and the faculty members who are guiding the project see a bright future for the idea. They say hydrogen can be cheaply produced on a commercial basis, does not use up a natural resource as does liquid petroleum gas, and is almost emission-free. •

** Before top dead center.*

*** A compound of hydrogen with another element or compound radical acting as an element, to reduce the volume by changing its form.*

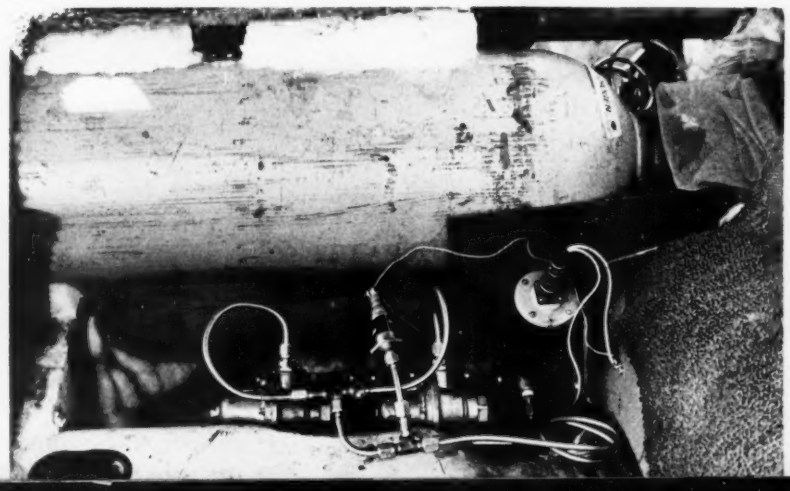
continued

WHAT ABOUT A HYDROGEN-FUELED CAR?

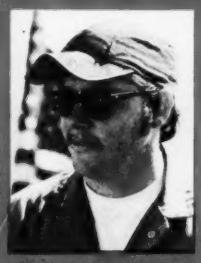


Exhaust gases from two cylinders are piped back into the intake system (arrow) where they help reduce the speed of combustion in the cylinders. This was a critical problem in the early development of the system.

The two hydrogen tanks behind the Gremlin's front seats hold enough gas for about 60 miles travel. A 20-gallon metal hydride fuel system will eliminate the pressurized tanks and provide range comparable to a similar-sized gasoline tank.



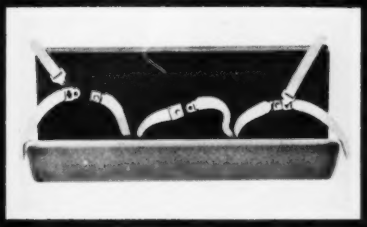
OPINIONS



Here is the third article in our "OPINIONS" series. Judging from reader feedback, many of you dig this feature, and enjoy pondering the thoughts and suggestions of fellow drivers.

We hope you find the series not only stimulating, but an opportunity to get into the other drivers' heads as well as your own, every time you drive.

The opinions expressed are those of the individuals named, and do not necessarily represent the position of DRIVER.



HERE ARE THE QUESTIONS:

1. What bugs you most about other drivers?

2. What do you think about seat belts? Do you, or do you not, wear them?

3. When you drive, do you ever think about the possibility or consequences of an accident?

4. What comments do you have about the push to require more safely constructed cars?

5. Insurance companies charge higher rates for younger drivers in the high-risk age group. What comments do you have on this?

continued

BM2 GERALD JOHNSON, USCG
Home: Superior, Nebraska

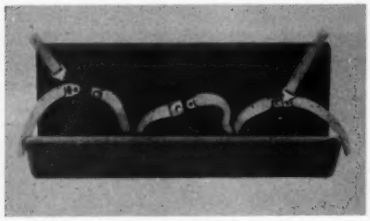
(1) "Driving a small sports car, as I do, puts a driver at a disadvantage because many people in larger cars seem to think that if they hit you, they are going to win. These people get my goat. Also, I don't think much about drivers who don't pay attention to traffic signs or signals. The 'lane weaver' is another kind of driver that gets me mad. You can never depend on these drivers to stay long enough in one lane for you to figure out what they are going to do next.

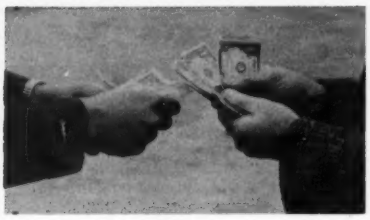
(2) "You bet I wear seat belts. So does my wife. I've driven a TR-6 for about 2 years now, and am a firm believer in seat belts. In fact, I am planning to put in a roll bar and install shoulder harnesses, too. Every convertible should have a roll bar, I think. There's nothing else up there to protect your head if you roll the car.

(3) "Back home in Nebraska, I learned a lot about driving on snowy roads, and discovered for myself that if I steered into a skid, I came out of it a lot quicker and a lot more safely. I use the same practice if I get into a skid on a wet street. Also, I use just enough throttle to keep the rear wheels pushing the car; not much, just enough to keep me going. If I didn't, I could slide off sideways. Hitting the brakes is the worst thing you can do in a skid. You're gone if you do that.

(4) "The new bumpers are a fine idea. Any improvement, in fact, is good. I'm not too sure about these air bags, though. I think they are dangerous at this stage of the game, but they could be improved. Right now, my biggest concern about air bags is that they could go off if you sideswiped somebody. This could possibly blind you at the critical moment and lead you into real trouble.

(5) "I've never had an accident or a traffic ticket since I've been driving—about 8 years, except two parking tickets. It sure helps a lot when the insurance comes up for renewal. I've already had a couple of reductions in my premiums because of my driving record. Safe driving pays off in the pocketbook as much as in staying healthy."





If you have opinions on our questions, why not drop us a line and let us know? We'd like to hear from you. Write to: Editor, DRIVER Magazine, AFISC/SEDD, Norton AFB CA 92409.

SGT JOHN HAINSWORTH, USA
Home: Salt Lake City, Utah

(1) "Discourtesy seems to be the rule of the road these days. Good drivers are courteous drivers. Inattention to what is going on by the guy who is driving is another thing that bugs me. Cars move really fast on the freeways, and you've got to be on the ball all the time.

(2) "I always wear my seat belt—and so does everyone in my family. I was forced off the road once when a car cut in too close in front of me. I hit the guard rail, took out a couple of posts, spun across the road, and wound up on the median. We went around a couple of times, really fast, and those belts kept all of us right in our seats. I wouldn't drive without them.

(3) "I think about accidents quite frequently. You see so many people getting into close shaves on the roads that it makes you wonder how so many of them survive. Thinking about them tends to keep you alert when you're behind the wheel.

(4) "Seat belts and over-the-shoulder harnesses are good things. The air bag idea seems like a good one, but I'm not too familiar with it yet. These new 5-mph front, and 3-mph rear bumpers are good intentions on the

OTHER COMMENTS:

"A driver should try to keep up with the traffic flow, as long as it is safe to do so. Drivers who slow down on the freeway for no good reason are a menace. I've caught myself

PFC JOYCE RICHMOND, WAC
Home: Columbus, Ohio

(1) "Tailgating and 'nuts' cutting in front of me bug me the most when I'm driving.

(2) "Yes, indeedy, every time I get into my car. The first thing I do is buckle up, then I start the engine. It's a habit with me now, and I don't even think about doing it any more.

(3) "You bet I think about getting involved in an accident, because it nearly happened to me once. A pick-up truck that cut around me on a freeway went out of control and started to spin. I slowed down as fast as I could, with the traffic behind me, and avoided him as he came around the second time. That really made me think about the other driver, and to expect the unexpected all the time I am driving.

(4) "It's about time the bumper

AZ1 WALTER SCOTT, USN
Home: Pittsburgh, Pennsylvania

(1) "Tailgaters bug me, and so do people who won't get out of the way of other drivers; those who just don't seem to care about other people on the road and poke along at their own speed, regardless of the traffic behind them.

(2) "Right on, man. I use seat belts all the time. I've never had to be glad I was wearing my seat belt, but I've heard about people who are alive today because they were belted in when an accident happened.

(3) "I don't like to think about accidents, but I know they can happen. I guess I just try to drive defensively all the time, and to keep out of trouble that way.

(4) "A safer car is a good thing—but, a safer driver is even better. Seat belts, those new bumpers they are coming out with, and even air bags can help cut down accident injuries, but it's the driver in the long run who is responsible.

(5) "I think the insurance companies should charge each driver according to his accident record. It isn't fair for them to charge everyone in one particular age group the same high price."

was coming back. Cars need better brakes, too. I also think that if a car can't go fast, then you can't speed and get yourself, and maybe other people, in trouble. Perhaps engine governors should be used.
(5) "It depends on the driver's record. Insurance premium-rate charges should be made on an individual basis, not on the age group as a whole."

OTHER COMMENTS:

"I keep my '64 Rambler tuned myself. I do all my own lube jobs, oil changes, and engine tuneups. Just recently, I changed the fuel pump and installed a new wiper motor. I learned how to do all this stuff on the farm where I grew up.

"I've been driving about 12 years now without ever having had a serious accident."

part of the auto manufacturers, but they aren't very useful. In fact, I would say they are downright ineffective.

(5) "I don't think much at all of these insurance rates. I'm 25, married, and have two children, but pay $192 for a 6-month policy on my Datsun sedan."

OTHER COMMENTS:

"I've been driving 11 years without a serious at-fault accident. Most of my 8 years' Army service has been in the transportation field, and I've been an instructor at the base drivers' school for the past 8 months. I'm rated as a truckmaster."

slowing down at the scene of an accident, but remembered where I was and got moving again.

"Sometimes, you'll come across sprinklers in operation alongside the road. I think they are a menace. They get the road wet enough to make it like ice. I try to stay clear of them; if I can't, I slow down until I am past them.

"I prefer driving a small car like my TR-6. The steering is positive and quick-acting, and the car is built to handle easily and accurately. I can steer my way out of a lot of trouble that might be impossible to avoid in a bigger car.

"Some European cars are a lot safer than any Americar car on the market. For example, the English Rover and German Mercedes-Benz are built so that if you have a head-on, the engine goes down **under** the passenger compartment, not back into the driver's lap. Also, their steering columns will snap off and not ram through the driver. Foreign car steering is much more precise than any I've found on American cars."

SIXTY FEET of TEXAS Highway

Editor's preface: In DRIVER we promote safe riding and driving by emphasizing the positive, not the negative. This means steering clear of detailed accident descriptions, for one thing.

In the case of the following article by Airman Moriset, we've made an exception, and I think you'll see why. . . .

by A1C Stephen Moriset, 96th FMS
Dyess AFB TX

Right off the bat, I'll tell you that this article is about motorcycle accidents, and the importance of proper protective gear, but with a switch.

The two following accidents are real experiences that happened to me. These are not just some stories that a safety officer has dug up to scare you. I know what it's all about, because I've been there.

It's very hard to write this article, because I'm writing it to the lucky people who have never met the pavement face to face, and to the dummies who think they are too good to drop a bike.

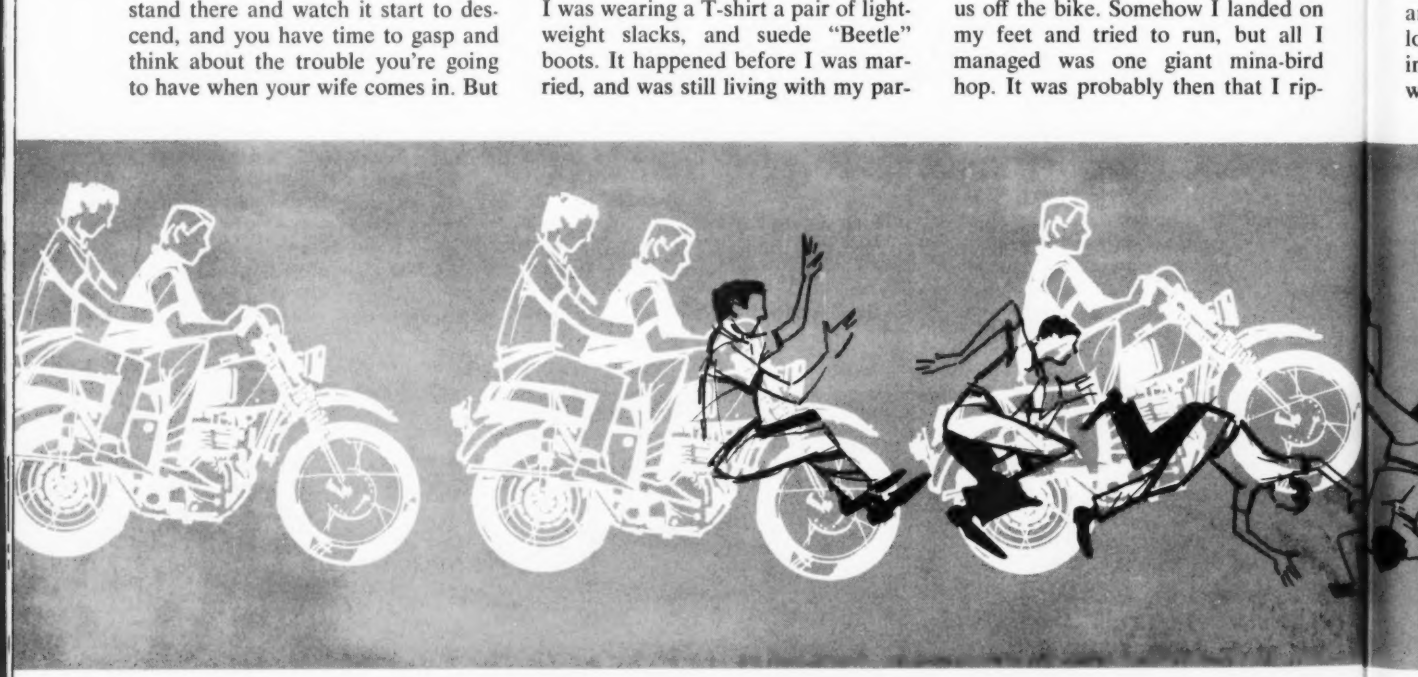
The hard part will be trying to get you to understand the strange and terrifying things that happen to you during the 3 or 4 seconds it takes to come within an inch of death; things like the slowing down of time. Each microsecond seems to last forever. Several examples might be like when you bump your wife's favorite casserole dish, and it starts to fall; you stand there and watch it start to descend, and you have time to gasp and think about the trouble you're going to have when your wife comes in. But you just can't seem to get your hands there fast enough.

Another example might be when you accidentally put your hand on a hot burner on the kitchen stove. You have plenty of time to realize you've done wrong, and that you will suffer; but, here again, you can't quite get your hand off the hot burner in time. And there are other strange things like mental blackouts and shock, both quite disturbing. Bear with me, and I will try to explain these things to you.

The first accident I had was as a rear passenger on a stock Suzuki 500. I was wearing a T-shirt a pair of lightweight slacks, and suede "Beetle" boots. It happened before I was married, and was still living with my parents. A friend of mine ate dinner with us, and later we decided to go down to his house.

Bobby lived five houses down the street, so we didn't bother to put on skid-lids. Bobby wasn't exactly a smart driver. Spinning doughnuts in the lawn, or pulling wheelies out of the driveway, was his idea of fun. We tore across the yard and down the street. The bike was still in first gear, traveling about 25 mph, when the front tire hit a loose brick.

The bars were ripped out of Bobby's casual grip. The jolt catapulted us off the bike. Somehow I landed on my feet and tried to run, but all I managed was one giant mina-bird hop. It was probably then that I rip-



ped the heels off both of my boots and smashed the cartilage in my knee. Fear raced through my head, for I felt that within seconds I could be dead.

Once again I took to the air. In this airborne state, while completely spread-eagled, I flipped 1½ times. This was the only time I saw Bobby or the bike, since both were doing some fancy aerobatics of their own. Then I saw the pavement coming, right for my face, and broke my fall with both arms.

Assisted by the time-warp, I watched both wrists slowly buckle under, then saw the pavement tearing at my hands. I'm sure that was when both wrists were sprained and my left elbow fractured. Well, this left me in an awkward position that must have looked a lot like the coyote making a dive for the roadrunner. My lower end (being heavier than my head) continued forward, while my face was slowing down on the pavement. My bod bent over backwards, spraining my back in the process. I finally settled down and started the long slide to Bobby's house.

The slide is the worst part. You have more than a group of time to watch the parked cars and dogs go flying by, while all the time keeping an eye on the fire plug coming at you at 15 mph. My T-shirt was ripped off, my belt was chewed half-way through, and you can imagine what my face looked like. My twist-o-flex snapped in two, leaving a deep cut on my wrist.

Finally, I stopped. Still very much conscious, I stood up—fully intending to beat the stuff out of Bobby. I got half-way to where he and the bike were and felt a rush of pain. It felt like every part of my body was on fire, and someone was trying to put it out with a fly swatter. To add to all of this pain, within a few minutes I had walked back to the house where dear, sweet Mom grabbed for all the iodine she could find. As she came at me, she kept telling me that it was going to hurt her worse than it would me. At the time, I was unable to laugh.

That accident was very different from the second. In the first one, I could remember every detail. I could hear the bike crash (for whatever it is worth to you, it sounded very much like the sound effects on the "Easy Rider" album). I remember my pocket change flying around, my watch coming off, and thinking how sore I would be the next morning.

There is a reason for telling you all of this. I hope you can see it for yourself, after reading about the second wreck.

Harry had a brand-new 250 Yamaha that he wanted to break in. So we decided to go up and visit my wife in Abilene. We spent the weekend there. We left in plenty of time to get back to the war at 1600. Harry and I were both wearing helmets. I also had on a *heavy coat, heavy pants, chukka boots, and some thermal underwear.*

Once again, I was riding shotgun. We were just east of Ranger, Texas, on I-20, approaching Ranger Hill at 70 mph. Harry had never driven this road before, so I pointed out a sign that warned of high winds.

Just as Harry started to slow down, that brand-new tire decided to blow out. Unlike Bobby, Harry had a good grip on the bars. My stomach began to turn, because I knew the chances of keeping control at that speed. For what seemed an eternity, Harry wrestled with the bike. . . . It is impossible to tell you how fast the pavement came up at us. There was no time to think about breaking my fall. It was like turning on a light in a dark room. It was just suddenly there. I fell on top of Harry, and our face plates crashed together. One of the things I remember most about the wreck was the look on his face.

The only thought I had at the time was to get off of Harry, and away from 300 pounds of hot and nasty metal bearing down on us. An interesting point here is that I couldn't hear anything. I could see the bike but couldn't hear it! I knew I had to roll or I would smear Harry into 60 feet of Texas highway. Instinctively I kept my head up. I was lying face-down on Harry. I dug one elbow into the pavement which rolled me completely over and back onto my stomach. I was stretched out, head-first, belly-down. My pants were being torn to shreds, but my longjohn underwear held up except for one small spot on my right knee. The sleeves on my

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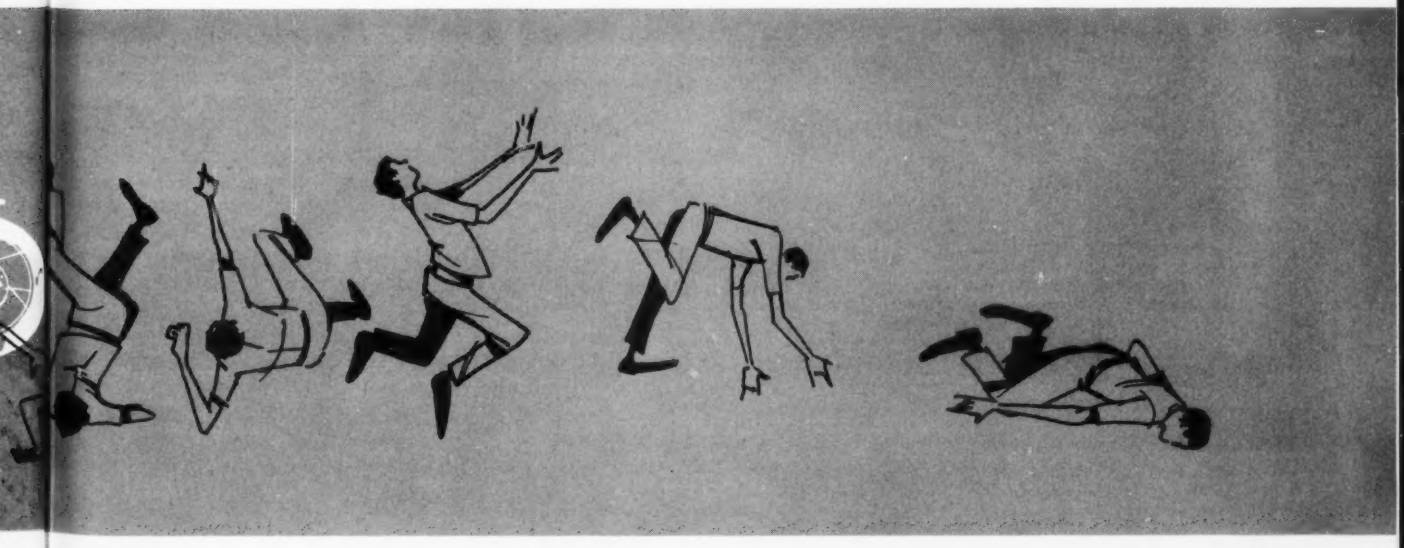


coat slipped up, leaving bare skin scooting on the pavement. I knew I had to roll. I tried to curl up, but I blacked out. I don't say "passed out" because of the short time involved.

After it was all over, I remembered at least three blank spots, all within seconds of each other. It is as if all of your senses stop—sight, sound, pain. Somehow I had succeeded in rolling. When I woke up I was in a wild tumble, completely out of control, but at least I wasn't sliding.

For some reason, the time-warp completely reversed itself. I felt like a 16-rpm record on a 45-rpm record changer. My arms and legs were everywhere. I tucked up into a ball. Once again I blacked out. I came to just in time to see a roadside reflector coming at me in TT time.* I missed it by a foot, then started off the road and into tall grass. Now I was sliding feet-first, belly-up. My coat was ripped up the back of my neck, But that good old GI underwear held up.

Finally, I stopped about 10 feet off the shoulder. I raised up on my elbow to try and find what was left of Harry. Harry was doing exactly the same. I saw the bike come to a stop. It was still running, but I couldn't hear it. I fell back on my back. I was very tired. Then I blacked out again. I must have been out for a minute or two, because when I woke up there was a man standing over me. I couldn't see his face because he was standing right in front of the sun.

A feeling of fear came over me, because I was completely disoriented. My head was still in the helmet and, with the tall grass and the blurriness of my eyes, it seemed like a segment of a Rod Serling flick. Slowly, reality came back into focus, and I could hear the semis rolling past us. I was very worried about shock, because I didn't feel any pain yet, so I lay perfectly still. The man was checking me over for broken bones. He said he didn't feel any. After I was sure of that fact myself, I slowly sat up. Then the pain came. It felt like all of the bomber bites I'd ever had rolled up into one big lump. It was at least 5 minutes before I was able to walk to the car that took us to the hospital.

Now I'll be the first to admit that I was lucky. I could have been thrown under the wheels of a semi, or I could have hit that roadside marker. At that speed, I could have broken my neck when I first hit. However, that is not the point. *The point is that in the first wreck, without protective gear and at the relatively low speed of 25 mph, I broke bones, sprained joints, left a couple of pounds of skin on the road, underwent 2 hours of surgery on my knee, spent 10 days in the hospital, and took 6 months to completely recoup. Whereas, with the proper gear and traveling at 70 mph, and with a driver who was alert, I received a lot of sore joints and some road rash on my arms and one leg.*

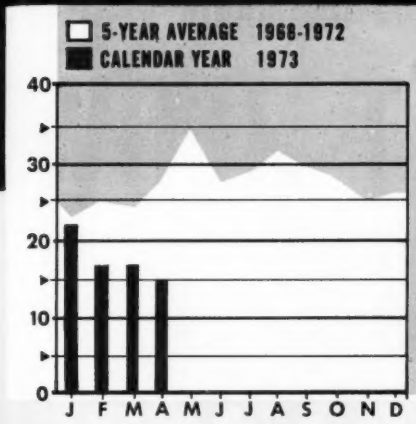
It is impossible to predict your action in an accident, especially at high speeds. But, from experience, I would suggest several things. **First and most important, always wear your skid-lid and other protective clothing. Secondly, be prepared for anything, such as bricks in the road, blowouts, or any one of a thousand different things. Thirdly, in the event of an accident, don't jump! Keep low, tuck your limbs in, and try to tumble.**

Perhaps some of you have seen the film of Evel Knievel's jump over the fountains in Las Vegas. Of course, he was traveling at very high speeds. Because of this speed, he was unable to completely curl up. He broke arms, legs, back, and pelvis, and a lot of other unimportant bones. He bounced around like a rag doll.

Another thing to remember after any kind of accident—don't move. How many times have you seen an injured football player lie still until he was checked over by a doctor? You will probably be in shock, which can dull your senses to the point of being able to get up and walk on broken bones, or perhaps your back could be broken and the slightest move could paralyze you or even kill you. Be sure you are okay before you get up to see how bad your bike is.

Even after both wrecks, I still enjoy biking. Its a great sport, as well as a great way to get from one place to another. Enjoy your bike—that's what it is there for. But, wear the right clothing and don't stick your neck out. ●

** Tourist Trophy event; a motorcycle race involving speed and skill on an irregularly shaped course, including a jump or a hill.*



TOTAL FATALITIES as of 30 APR:

CY 1973: 72

5-YEAR AVERAGE: 99

A monthly recap of selected accidents presented solely in the hope some will benefit from the unfortunate experiences of others

HOW GOES IT?

SPEED IN UNFAMILIAR CAR

Rank: Sgt/Amn Type vehicle: Jaguar MK 2 4-door

After completing a 6-hour duty shift and drinking for some time on base, the Sgt and the Amn departed about 0130. The wreck was found at 0700. Apparently the Sgt missed a right-hand turn in dense fog, and the car impacted a large tree. The Sgt had owned the vehicle only 6 weeks, and two of his friends told investigators the brakes had to be pumped to make them work. Seat belts were not installed.

The Sgt received multiple, fatal skull fractures, and the Amn suffered serious skull, leg, and rib fractures upon being partially ejected from the car.

Probable cause:
Speed excessive for driver and weather conditions.

Probable contributing factors:
Fatigue; alcohol; driver's unfamiliarity with car; faulty brakes.

SPEED AND IMPROPER BRAKING

Rank: A1C/A1C Type Vehicle: M151 Jeep

The A1C operator was killed and his A1C passenger lost his right arm when the Jeep went into a skid and flipped. The driver suddenly applied the brakes on a wet, oily road, in daylight, in a light rain. The vehicle turned counterclockwise 160 degrees, and skidded for 95 feet before the two right wheels struck two rocks which flipped it onto its right side. It slid for another 20 feet and impacted a wooden utility pole.

Installed seat belts were not worn.

Probable causes:
Excessive speed; improper use of M151 four-wheel drive Jeep brakes on wet, oily road.

Possible contributing factor:
Use of drugs.

RESTRAINT SYSTEM SABOTAGED

Rank: TSgt Type vehicle: 1972 Volkswagen

The TSgt was killed instantly when he impacted the steering column of his vehicle after it approached a T-intersection at 55 mph and skidded into the embankment ahead.

The driver had apparently fallen asleep at the wheel at 2235, and had awakened at the last moment and braked hard before entering the crossing.

The seat-belt/shoulder-harness system, the alarm buzzer, and the "Fasten Seat Belts" indicator had all been negated by buckling the seat belt behind the seat.

Investigators were of the opinion that use of the restaint system could have prevented fatal injuries. Impact speed was estimated at 35 mph.

Probable cause:
Falling asleep at the wheel.

Probable contributing factors:
High blood pressure and hypertension medication, plus alcohol intake, could have induced sleepiness; failure to use restraint system.

WRONG-WAY MILITARY DRIVER

Rank: 1st Lt Type vehicle: 1966 Mustang

After leaving a party, the Lt made a wrong turn at an intersection at 0230 and drove for 200 yards, southbound in the northbound lanes of a major highway.

The Mustang struck a VW, killing its civilian operator and injuring a passenger. The Lt, who was not belted in, suffered temporary total injuries.

Probable cause:
Driving against traffic on one-way thoroughfare.

Probable contributing factors:
Alcohol-impaired judgment; fatigue.

WRONG-WAY CIVILIAN DRIVER

Rank: Sgt Type vehicle: 1964 Chevrolet sedan

The Sgt was killed instantly when his sedan was struck head-on by a civilian-operated van traveling west in the eastbound traffic at 1610. The civilian apparently did not realize he was driving in the wrong direction, in the wrong lane, despite horn blowing by other drivers as well as several near misses.

The Sgt was strapped in, but the crash forces were too great for survival. The civilian driver, who was driving while his license was suspended, was critically injured.

Probable cause:
Wrong-way driving.

Probable contributing factor:
Possible use of alcohol by civilian.

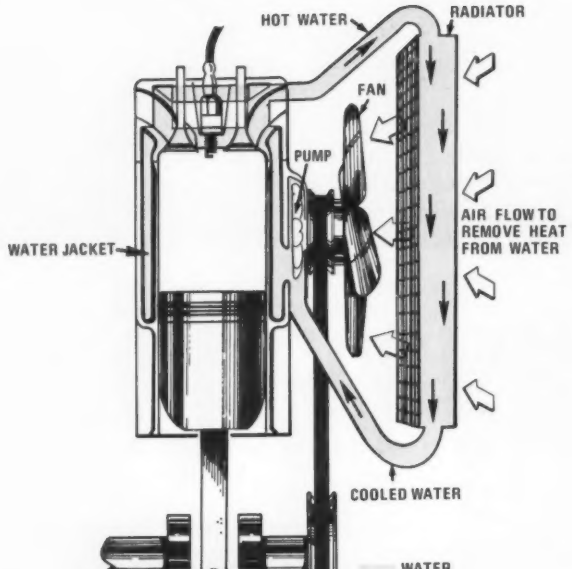


FIG. 1

THE BACK-YARD MECHANIC PART VI

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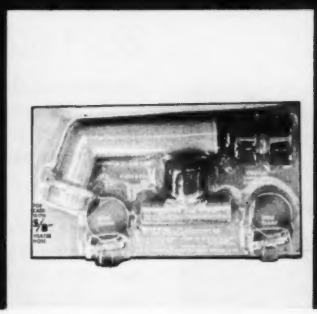
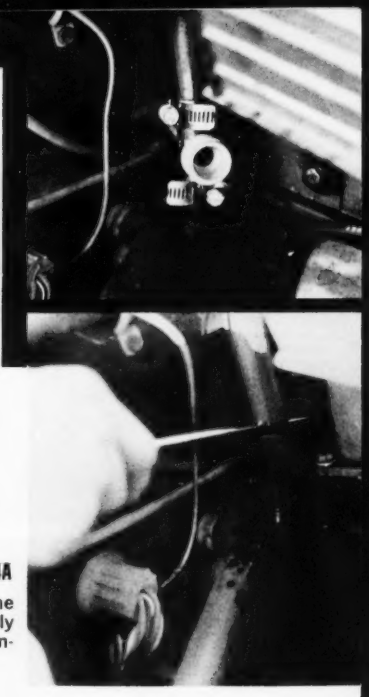
1 **The most common** type of pressure tester attaches to the radiator filler neck. Pump it until the dial indicates the pressure rating of the system. If the pressure reading drops, there is a leak in the system. Also use the tester to check the radiator cap for a leaking seal.

2 **Radiator** "Quick-Flush" products help to loosen accumulated rust and sludge before flushing the system.



3
Using an inexpensive flushing kit is the safest, easiest, and most effective way to flush your cooling system at home.



4-4A
Installing a kit to flush the cooling system requires only cutting a heater hose and installing a T-fitting.

Although it's still early in the hot season, many of you have probably already had occasion to glance nervously at your temp gage or "idiot light" as you passed a car with its hood up—radiator steaming.

If the sight of an overheated car bothered you a little bit, you had good reason to be concerned. More cars than ever are overheating. This is partly because today's low-compression, emission-controlled engines run much hotter. Newer cars also have hotter rated thermostats, but smaller radiators and a decreased ability to dissipate heat. However, *if* your car's cooling system is kept in good condition, it can easily handle the heat.

Most cars overheat because their owners don't take a few minutes to do the very simple and inexpensive periodic maintenance their cooling system needs.

It's easy to understand the need for a cooling system when you realize that combustion temperatures inside your engine reach 4,500°F. Temperatures of lubricated parts, such as pistons, exceed 400°F, and the engine would quickly destroy itself if some means were not employed to dissipate the heat.

Most cars circulate liquid (some engines are air cooled) around the cylinders and heads to conduct heat away from the engine. The hot coolant is pumped from the engine to the radiator and cooled by air from the fan. Then the cooled liquid is returned to the engine to repeat the job. (Fig. 1.)

PRESSURE ESSENTIAL

In addition to liquid coolant, proper pressure is essential in a modern cooling system. Cooling systems are pressurized to allow the engine to run hotter without boiling the vital coolant. For instance, the boiling temperature of ethylene glycol antifreeze-coolant at sea level is around 220°F. Add 15 pounds of pressure, however, and the boiling level jumps to about 265°F.

Since the normal operating temperature of many engines is near 200°F, it is essential that your car's cooling system hold the proper pressure for the engine to keep its cool under strain.

This pressurization is why you should remove the radiator cap very carefully, only after bleeding off the pressure—especially when the engine is hot. What many of you may have painfully discovered is that when the engine is hot, the coolant may be hotter than its normal boiling temperature, but doesn't boil because it's under pressure. When the radiator cap is removed quickly, the pressure drops, and the boiling level falls well below the temperature of the coolant. The result: a dangerous geyser of super-hot liquid.

PRESSURE CHECK

Checking your car's cooling system for pressure leaks is an important part of maintaining the system. This should be done at least every 2 years, when the system is flushed and other maintenance performed.* The pressure test can be performed before draining the coolant, to test the hose condition, since most leaks occur at hoses or connections. If you're planning to replace any hoses, however, do a pressure check as a final step to be sure the system is holding pressure.

You can purchase a pressure tester for around $20. But, no more frequently than you'll use it, you may want to head for the hobby shop or have a mechanic perform the pressure check.

There are two basic types of pressure testers, but the most common type simply attaches to the radiator filler neck after removing the cap. Pump pressure into the system until the dial on the tester indicates the pressure rating for your car (the service manual lists this, but generally a system which holds 15 psi is pressure tight). Wait about 10 minutes—if the pressure on the dial drops, you have a leak in the system.

CAP IMPORTANT

Clean any foreign material from beneath the rubber sealing washer on the underside of the radiator cap with a piece of stiff cardboard. Attach the cap to the tester and pump up the pressure until the dial indicates the pressure rating shown on the cap. If

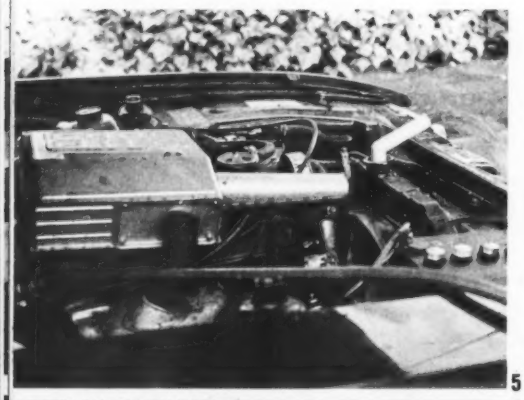
continued

** A recent survey indicated more than half the cars on the road have cooling systems which aren't holding their rated pressures. Since many cars overheat for this reason, it might be advisable to pressure-check the system more frequently, especially during extra hot weather, or when mountain driving is anticipated.*

The products illustrated in this story are not necessarily endorsed by DRIVER or the U.S. Air Force.

continued

DON'T BLOW YOUR COOLANT



5

Hook a water hose (garden type) to the T-fitting. Water is back-flushed through the system—when it splashes out of the radiator, colorless, the system is clean.

5A

pressure bleeds off after 5 minutes, you need a new cap. Leaking radiator caps are one of the main causes of overheating, so always replace a cap which leaks.

Your car's cooling system operates (although at a lessened capacity) even if it has a pressure leak. However, your car can't keep its cool without some type of liquid, or if rust and corrosion block the coolant passages and the radiator.

COOLANT WEARS OUT

Draining, flushing, and replenishing the cooling system periodically is the most productive but most overlooked cooling system maintenance. These steps are important because all types of antifreeze-coolant lose their potency over a period of time. When the rust inhibitors in the solution are exhausted, corrosion and rust accumulate and clog the system. This clogging leads to overheating, and eventually will lead you to a shop for a radiator back-flush.

However, the fairly expensive back-flush can be easily avoided by frequently draining and flushing the system to eliminate contaminants. Most car manufacturers recommend this procedure every 2 years or 24,000 miles. But, since antifreeze-coolant is inexpensive, it may be well worth your time and money to perform this service yearly—especially if you notice a buildup of rust or sludge in the radiator.

FLUSHING KIT

Draining and flushing the cooling system can be done by either of two methods. The usual method requires opening all drain plugs on a hot engine (some of which may be hard to get to), and trying to flush out rust and sludge with a hose. The new "hassle-free" method requires purchasing a flushing kit for less than $2, and spending 5 minutes to install the kit and completely flush the system.

DRIVER strongly recommends using the flushing kit, which is the fastest and most efficient method of flushing your car's cooling system at home. Using a kit is also a safer method, since it eliminates the need for opening the drain plugs, a possible source of a bad burn.

Because it is the most practical flushing method, we'll limit our discussion to the use of these widely available kits. If you prefer to drain and flush the cooling system manually, however, remember that *you must open the engine drain plugs as well as the radiator drain cock to thoroughly purge the system.* It's also a good idea to get a can of radiator "quick-flush" and follow

6

Inspect hoses, and replace as necessary. Hoses excessively mushy or brittle when squeezed are overdue for replacement. Lower radiator hose may look good; but, if the spring inside has lost tension, it will cause overheating problems.

7

Universal, or flexible replacement hoses are less expensive, more widely available, and work as well as hoses designed for your car. Worm-type hose clamps are best.

Replace belts which are frayed, cracked, or glazed. Adjust the belts so they have less than ½-inch of free play between the pulleys. A special gage is recommended for exact tensioning.

8

the instructions on the can before flushing the system by either method.

USING FLUSHING KIT

Kits come with nearly everything needed to flush clean all but the most corroded systems, and include easy-to-follow instructions. To install the kit, first carefully release the pressure at the radiator cap. Locate the heater hose which runs from the firewall to the engine block. There are two heater hoses; one runs to the water pump, but the one which goes to the block is the one you want.

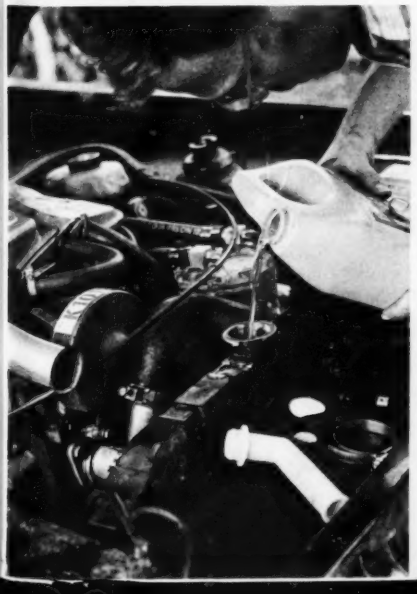
Cut the heater hose in two near the firewall. Insert the T-fitting, provided in the kit, into the hose. Tighten the two hose segments to the "T" with the clamps provided (see pictures). Remove the radiator cap and insert the splash pipe into the radiator neck. Install a hose (garden type) at the T-fitting, and turn the water on full blast.

The water flowing in from the hose forces the coolant in the engine back through the system passages and up through the radiator, back-flushing the system. Simply let the water run until it splashes out of the radiator, colorless—then the system is clean.

HOSES

Check all radiator and heater hoses after flushing the system. Replace hoses every 2 to 3 years, or when they are worn, cracked, or even partially split.

Fill your cooling system with the proper mixture of antifreeze-coolant after flushing the system and inspecting hoses and belts. Plain water is not recommended for cooling system use at any time.



Also change any hose that feels mushy or extremely brittle when squeezed firmly. Be especially watchful for signs of splits when you squeeze the hoses; these splits have a habit of bursting wide open under pressure.

Don't overlook the small bypass hose on some models, located between the water pump and engine block. Also check the lower radiator hose very carefully. This hose contains a coiled-wire lining to keep it from collapsing during operation. If the wire loses tension, the hose can partially collapse at high speed and restrict coolant flow. This results in a very elusive overheating problem. For this reason, most mechanics replace this critical hose every 2 years, regardless of its apparent condition.

Replacement hoses designed for your car may be difficult to find, but the more popular universal or flexible type hoses will work just as well if they're of good quality. Be sure to remember that the lower radiator hose must be replaced with a hose containing a coiled support wire. Also keep in mind that installing one or two new hoses may increase pressure in the system, causing unreplaced hoses to leak unless they're in very good condition.

Before installing a new hose, clean off the connection with a wire brush and coat the surface with sealing compound. Place *new* clamps (don't reuse old spring-type clamps, even if they look good) on each end of the hose before positioning the hose, to make the clamping procedure easier. Slide the clamps to about ¼-inch from the end of the hose when it is properly positioned on the fitting. Tighten the clamp just short of cutting into the hose.

BELTS

Since drive belts are an essential part of your cooling system, you should replace those which show wear, are cracked, or are glazed on the inside surface. A loose or glazed fan belt is especially bad, since it may reduce airflow and keep the water pump from delivering the required amount of coolant. The belt can also slip on the generator/alternator pulley and allow the battery to run down. A fan belt is one of those very inexpensive items which can cause a very expensive headache if if it fails on the road. Don't hesitate to replace a worn belt, and carry a spare.

Adjust all belts with a tension gage if you have one—exact tensioning is most important on a belt driving a lot of power equipment. If you don't have a gage, adjust the belts until there is about ¼- to ½-inch play when the belt is pressed between the pulleys. Overtightening belts causes serious damage in many cases, so be sure there is at least ¼-inch of play.

WATER NOT RECOMMENDED

With all the hoses securely clamped, and the belts properly tensioned, tighten the draincock and replace any removed drain plugs. You are ready to refill the system with the proper mixture of good-quality antifreeze-coolant.

Plain water is no longer recommended for cooling system use, even in summer. Glycol base coolant has many advantages over water; it dissipates heat more readily, has a higher boiling temperature, and has rust inhibitors as well as water-pump lubricants.

FILLING THE SYSTEM

To fill a system which has been flushed with the flushing kit, disconnect the garden hose at the "T" and simply pour coolant into the radiator. The coolant will displace the water in the system, which will flow out at the "T." When you've added the correct amount of coolant (your manual gives the quart capacity of your cooling system, and the antifreeze container has a mixing chart on it), close the "T" with the cap provided. Since the "T" remains in place, all you have to do next time you want to flush your cooling system is to hook up a hose.

On a system which was drained through the drain openings, pour in the correct quantity of coolant (again, remember to close all drain openings) and fill the system the rest of the way with water. In either case, however, never exceed a ⅔ mixture of antifreeze to ⅓ water. While a 50-50 mixture is generally about normal, exceeding a 2 to 1 mixture solution actually decreases the heat dissipation and freeze-protection characteristcs of the solution.

A final pressure check is a good idea, especially if you replaced any hoses. The check will assure you that all hoses are sealing correctly, and that the system is pressure-tight. If your car's cooling system fails to hold proper pressure after replacing hoses and tighten-

continued

continued

DON'T BLOW YOUR COOLANT

ing clamps, however, check Chart A for other sources of pressure leakage. If your system maintains the correct pressure, but still overheats, check Chart B for common causes of overheating.

JUST IN CASE

Timely maintenance should prevent the problem of a hot car, warped engine block, hot temper, and expensive towing bill. But, it's a good idea to have a few items in the trunk for emergencies.

You can never tell when a drive belt might snap, so don't take any chances with the critical fan belt. Always carry a spare belt and the tools to install it. Spare radiator hoses shouldn't be necessary if you change the hoses regularly. But, a roll of tape and a few extra hose clamps can be useful for temporarily sealing small leaks or reinstalling a popped-off hose.

A gallon of water and a few rags to protect your hand when removing a steaming radiator cap are essential. The rags can also be stuffed into the filler neck to temporarily replace a blown radiator cap.

Finally, don't forget to check the coolant level frequently, and be sure to have the solution checked for freeze protection before the first north winds start blowing.

Installing an inexpensive coolant recovery system is one of the best ways to keep your car's cool. These devices are standard on some cars, and eliminate coolant loss as well as keep your car running cooler.

"Keep-Cool" Radiator products are additives which really work. They lower the operating temperature of all engines, and are especially good for air-conditioned cars, or cars which run hot.

CHART A

- **Check** the radiator's lockring to be sure it isn't pulled up or distorted. The radiator cap should seal easily and tightly on the ring.
- **Check** for leaks at the thermostat housing gasket.
- **Check** for leaks at the water pump. The gasket or the pump itself could be leaking.
- **Check** for leaks at the radiator seams. If a can of radiator sealant doesn't stop the leak, you should take it to a reputable radiator shop for repair.
- **A head gasket** could be leaking. Drop some oil from the dipstick onto a hot engine part, such as the exhaust manifold; if it sizzles, water has leaked into the oil. Have the engine checked by a good mechanic.

CHART B

- **Check for** obstructed airflow through the radiator. A high-pressure spray from a hose is usually sufficient to remove an accumulation of bugs or other obstructions from the radiator.
- **Check** the coolant level with the engine at operating temperature (be sure to release the pressure and protect your hand when removing the cap). Bring the level up to the bottom ring on the filler neck with the engine idling.
- **Check** the antifreeze mixture to be sure it is at the recommended strength. Try one of the radiator "Keep-Cool" additives.
- **Check** ignition timing and brakes. Retarded timing or dragging brakes cause an engine to run hot.
- **Check** the fan drive and its clutch. This is a special device designed to turn the fan at an increased speed when the engine gets hot. Your manual shows how to check this device if your car has one.
- **Check** the thermostat operation. A thermostat sticking shut will cause a car to overheat, since the coolant can't circulate to the radiator. Manuals show several methods for checking the thermostat. Be sure to install a new gasket if you remove the thermostat for inspection. ●

ANNUAL INDEX

DRIVER's 1972 Annual Index has been included in the June 1973 Safety Officers' Study Kit issued to all unit safety offices.

All safety officers are urged to make the Indexes, along with past copies of DRIVER magazine, readily available to all unit personnel.

Additionally, limited numbers of the 1970, 1971, and 1972 Indexes are available to the readers. Write: Editor, DRIVER magazine (AFISC/SEDD), Norton AFB CA 92409. •

ABOUT MISS DRIVER

(see page 7)

Lovely, red-haired Nancy Secombe is a native of San Bernardino, California. Her hobbies include waterskiing, modeling, and motorcycle riding. Nancy's dad owns a cycle shop, and taught Nancy how to ride. Her bag is dirt riding, and she seldom does any street riding because "it's just too dangerous." Nancy has taken some spills in the dirt but has not been badly injured, only "shaken up."

DRIVER strongly suspects her good luck, to date, stems from the fact that she "always wears heavy boots, gloves, and jacket, and a Z90-approved helmet when riding." •

ANSWER TO "WHAT SHOULD YOU DO?"

Your best choice is to hard brake and turn right, off the highway. If you stamp on the brakes to stop, the car behind will rear-end your car—or you might go into a skid and lose control. Here is a situation where you just have to take a chance, but whatever is off to the right can't be any worse than what you have ahead or behind. This is a good example of how important it is to be aware of the total driving environment. It's not enough to be conscious of only the road. You've got to know the condition of the shoulder and type of terrain. •

SNOW-JOB

DRIVER readers have swamped the editorial staff with subscription and distribution requests. While we do enjoy reading such complimentary missives, *we are not authorized to handle subscriptions or distribution.*

All subscription requests should be addressed to the GPO (address shown in "SUBSCRIPTION" block, bottom of masthead page). Adding "CSS Subscription Unit" to the address, when you write follow-up correspondence concerning your subscription or change of address, may expedite the action. If you don't get results, let us know.

The channel for *USAF* distribution queries is the unit Publications Distribution Office (PDO); for *Dept of the Navy* personnel, it is NAVSAFECEN (see "SUBSCRIPTION" block). *Coast Guard* and *Army* personnel should use their own service channels (see your super or safety officer).

As stated in the small print of the "SUBSCRIPTION" block, "ALL OTHER CORRESPONDENCE WILL BE WELCOMED BY THE EDITOR." •

state driver's handbooks

Of the many booklets, pamphlets, and other printed documents you usually get when you sign in at a new duty station, one could be a copy of that state's driver's handbook. Please don't tuck it away in your briefcase and forget about it. That little booklet could save you a lot of time and trouble—and perhaps money.

Each state issues a similar publication covering just about all you need to know about speed laws, signals, rules of the road, road signs, and many other important matters. This information could prevent your being apprehended for unknowingly violating that state's MV codes, and will help you pass the driver's exam when that time comes.

Each state has its own laws covering motor vehicles, and often those laws differ from state to state. This can be confusing; but if you read the driver's handbook, it will clear up your problems.

If, however, you do run into something that isn't explained in the handbook, ask your base security police or the state highway patrol. They'll be pleased to give you the straight dope, and you will be a safer driver for knowing.

So make it a point to sit down as soon as you can and read that little booklet. It could be a lifesaver. •

BACKFIRE

Address your letters to:
Editor
DRIVER Magazine
SEDD
Norton AFB CA 92409

NAVY SAFETY SIGNALS

Tactical Electronic Warfare Squadron 133 (VAQ-133) is a carrier-based Navy squadron with about 150 enlisted men, 24 officers, and 4 aircraft. Since the squadron was activated in 1972, we have been receiving copies of DRIVER regularly.

As Aviation Safety Officer, I handle safety related materials such as DRIVER. All hands have found your magazine interesting and informative, and each working space receives a copy each month.

When I saw the request for "OPINIONS" in the Feb '73 issue, I had the request and the questions reprinted in our Plan of the Day [Daily Bulletin]. The Safety Signal Form mentioned in the POD note is our usual safety suggestion form. Copies are placed around the squadron, to be filled in and placed in drop-boxes. I am sending one response to your "OPINIONS" questions so received, and will continue to use the POD and Safety Signal program to elicit responses to the feature.

LCDR J. A. Julian
VAQ-133
FPO San Francisco 96601

Thanks for the fine assist, Commander.

GENERATION GAP?

Those interviewed in DRIVER's Feb '73 "OPINIONS" were alright in what they said about tailgaters and whatnot; but, being 20 and over, they can't really give a true opinion of how a young driver under 18 really feels.

When I first got my license in 1970, boy, I thought that was the greatest thing that could ever happen. But, as I drove from day to day, I started seeing just how close death could be. In the 3 short years I served with a volunteer fire company in Delaware, I learned and saw a lot. Most of the accidents I've seen had to do with speed; not only the young drivers, but everybody. They were all in a hurry and disregarded traffic signals, etc. The real thing that youth has that really puts them down is that they're not afraid of speed until they see their best friend or someone else killed in an accident.

I think the Air Force Multi-Media Driving Training will go far. I think it might get the potential danger of the auto across to the younger set. I just completed the 5-day course, and feel that it brought out some points I might never have thought about for the rest of my life. It proved to me that no driver, no matter how good he or she is, knows everything about driving. I never realized the things I was doing wrong until I had it proved on film. I think more and more as time goes on that maybe, if enough people can take such a course, there would be a lot more respect shown by each driver as to who should have the right-of-way. It seems these days that people are getting more in a hurry. If they could just realize that it would save only a minute or so, they could get there safer and with less chance of getting killed, or killing someone else.

AB Ronald J. Riccio
7254 PSC Box 8412
Lowry AFB CO 80230

Thank you, Airman Riccio. We're with you.

TV HAZARD

I have noted an area with exceptional possibilities for education in the use of seat belts is not being exploited. Perhaps you, with your obvious contacts, can bring it to the attention of someone who can help.

Watch some of the TV shows popular with young people, in which there

is a lot of driving. Have you ever seen any of them in the act of fastening their seat belts before launching into a high-speed pursuit? Or even any of the "bad guys" unbuckling before they jump out and run? Surely, the "tube" should fit the old adage about one picture being worth a thousand words. How about it?

Lt Col D. C. Childers
3902 Supply Sq
Offutt AFB NE 68113

Several years ago the National Association of Broadcasters inserted in the voluntary production code certain amendments pertaining to the use of seat belts, especially in TV commercials. It seems, however, that the practice has been slipping. Since the agreement is voluntary, perhaps the lifesaving practice would be resumed if enough of our more than 2½ million readers were to write to Mr. Vincent T. Wasilewski, President, National Association of Broadcasters, 1777 "N" St. N.W., Washington DC 20036.

CONVINCING ARGUMENT

As a regular reader of DRIVER, I feel compeled to respond to two artices in the Feb '73 issue.

The first is the "Experiment at Cape May." The U.S. Coast Guard is to be commended for initiating such a fine driving training program. If all of our Armed Forces had such a program, we'd be off to a good start at supplying the nation with safer and more competent drivers.

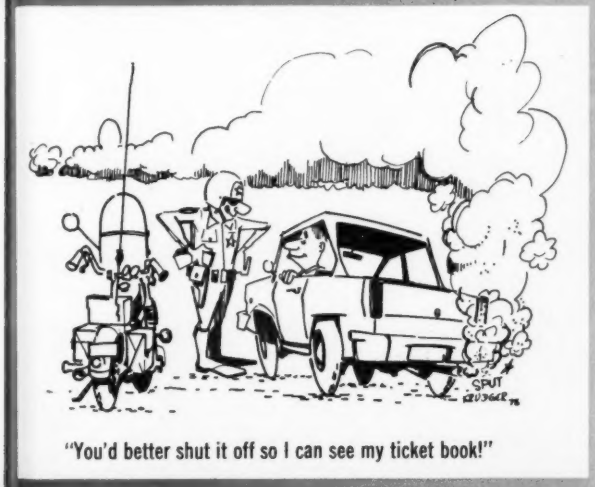
The second is the "OPINIONS" feature. I agreed with four out of the five persons interviewed. Safer cars, seat belts, and a more intensified driver education program are all important.

I have enclosed a photo for the benefit of A1C Vernon McKenney and others who might have the same outlook and opinions he gave in his interview. The driver crashed the XKE into a house at +90 mph, but walked away unjured because he was strapped in with both seat belt and shoulder harness. I was also strapped in the passenger seat, and suffered only a noncritical head injury. The A1C from Covina thinks a big person doesn't need a belt to hold him in, but that could be a deadly mistake—especially if the wheel smashes his rib cage.

A1C Kurt W. Fisher
Box 1562, 601 TCWg
APO New York 09130

*Thank you, Airman Fisher. Having survived **THAT** wreck, you do have an important message to impart.*

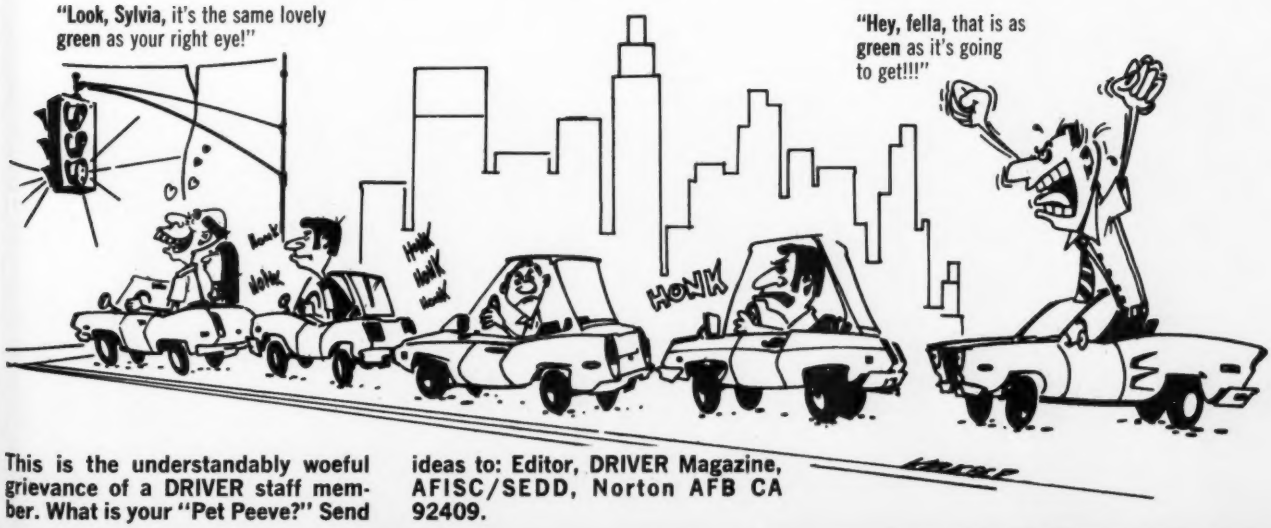
☆U.S. GOVERNMENT PRINTING OFFICE: 1973—789-420/9



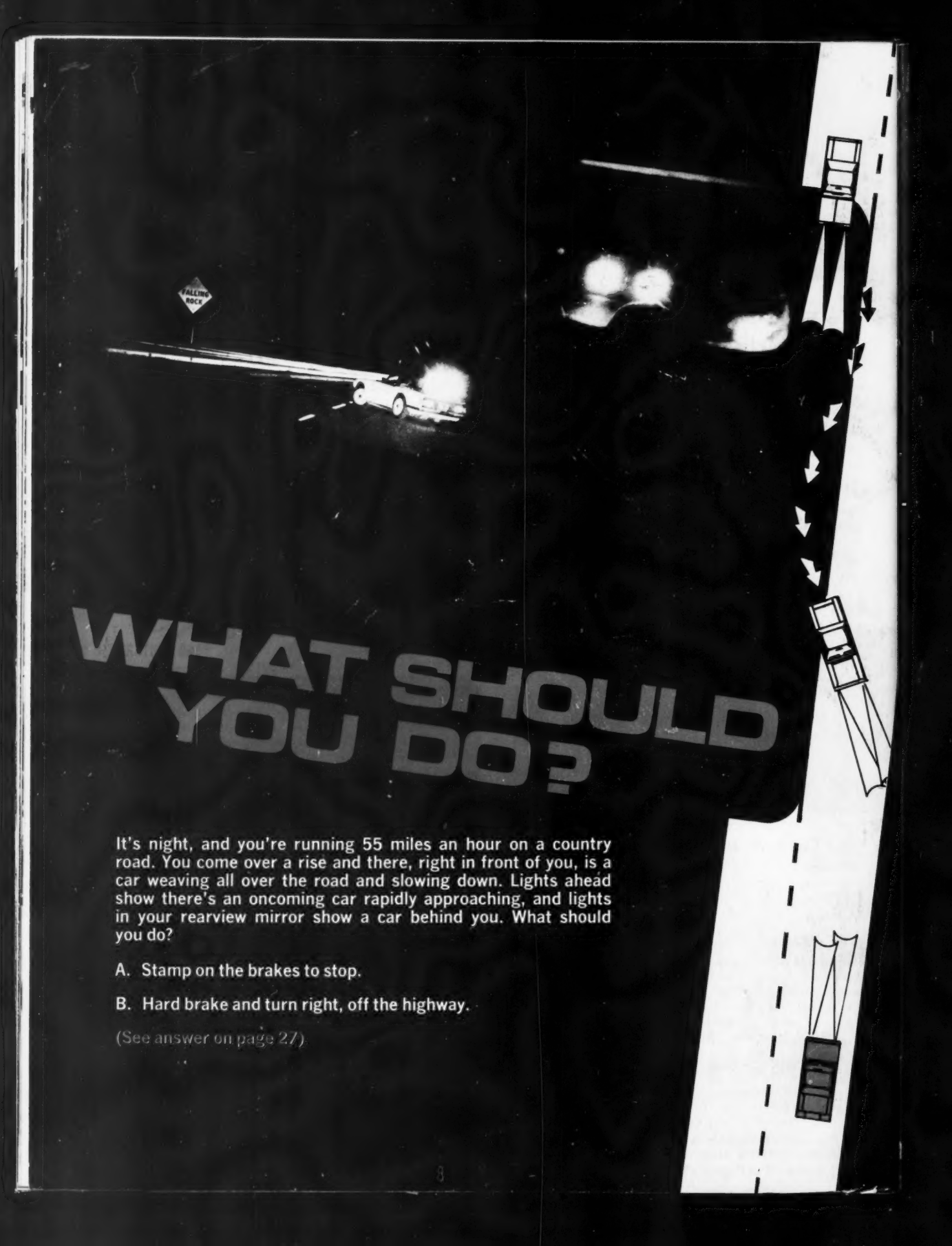
"You'd better shut it off so I can see my ticket book!"

PET PEEVE

My pet peeve is the driver in front of me—often five or six cars ahead—who sits numbly at an intersection and gazes fondly at the lovely green light. Most traffic lights are timed to let about 10 cars through before they turn yellow. The numbhead who apparently loves the pretty green color frustrates everyone behind him—most of whom will have to sit through the next red light, while he barely makes it across the intersection on the yellow. Green is beautiful, for sure—but brick red from frustration is a pain in the neck.



This is the understandably woeful grievance of a DRIVER staff member. What is your "Pet Peeve?" Send ideas to: Editor, DRIVER Magazine, AFISC/SEDD, Norton AFB CA 92409.



WHAT SHOULD YOU DO?

It's night, and you're running 55 miles an hour on a country road. You come over a rise and there, right in front of you, is a car weaving all over the road and slowing down. Lights ahead show there's an oncoming car rapidly approaching, and lights in your rearview mirror show a car behind you. What should you do?

A. Stamp on the brakes to stop.

B. Hard brake and turn right, off the highway.

(See answer on page 27)